

In response to the Office Action, Applicant traverses the rejections to claims 1-20.

With regard to the rejection of claims 1, 4-8 and 10-15 under 35 U.S.C. §103(a), as being unpatentable over Yamada view of Yuan, Applicant respectfully traverses on the ground that the Examiner has failed to establish a proper *prima facie* case of obviousness under 35 U.S.C. §103(a), as specified in the Manual of Patent Examining Procedure (M.P.E.P.), Eighth Edition, August 2001, §2143.

As set forth therein, three requirements must be met to establish a *prima facie* case of obviousness. First, the cited combination must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation to combine reference teachings. Third, there must be a reasonable expectation of success. While it is sufficient to show that a *prima facie* case of obviousness has not been established by showing that one of the requirements has not been met, Applicant respectfully believes that none of the requirements have been met.

First, assuming for purposes of argument that Yamada and Yuan are combinable, their collective teachings fail to teach or suggest all the limitations of each of claims 1, 4-8 and 10-15.

Independent claim 1 recites a packaged integrated circuit having a die and a package body, formed from encapsulant, which at least partially encloses the die. A leadframe is connected to the die and is also at least partially enclosed within the package body. The leadframe has leads extending from the package body. A subset of these leads are separated by a lead-to-lead pitch, and at least two adjacent leads of the leadframe are separated by a space larger than the pitch. At least one additional lead is connected to the die and disposed on an underside of the package body. The additional lead is connectable to a circuit mounting structure trace passing between the adjacent leads separated by the space larger than the pitch.

Yamada discloses a semiconductor device having a plurality of first and second electrode pads providing the ability to adjust the intervals between wires for electrically connecting the pads and leads, and avoid electrical contacts between the wires at the corners of the semiconductor device. Yuan discloses an integrated circuit packaging technology, specifically a tape carrier package, with dummy pads and dummy leads for reinforcement of the package construction.

Independent claim 1 differs from Yamada and Yuan in that the proposed combination fails to disclose at least one additional lead connected to the die and disposed on an underside of the

package body. The proposed combination also fails to disclose that the additional lead is connectable to a circuit mounting structure trace passing between the adjacent leads separated by the space larger than the pitch. In providing support for the rejection, the Office Action cites column 3, line 65 through column 4, line 4, of Yuan. However, this portion of Yuan describes the spacing of the dummy leads and the lead arrangement scheme, which help in providing an even distribution of the encapsulation to the back side of the semiconductor chip. There is no description of a lead disposed on an underside of the package body, nor its ability to connect to a circuit mounting structure trace passing between adjacent leads separated by a space larger than the pitch.

Second, with respect to claim 1, Applicant asserts that no motivation or suggestion exists to combine Yamada and Yuan in a manner proposed by the Examiner, or to modify their teachings to meet the claim limitations. For at least this reason, a *prima facie* case of obviousness has not been established. Applicant strongly believes that one ordinarily skilled in the art would not look to Yuan's tape carrier package structure with dummy pads and dummy leads for package reinforcement to modify Yamada's semiconductor device having two sets of electrode pads for electrical connection to leads through wire bonds, or vice versa. That is, the teachings in each reference are directed to completely different environments; one (Yuan) toward a type of integrated circuit packaging technology characterized by the use of a tape carrier rather than a leadframe or a substrate, the other (Yamada) toward semiconductor pad placement for optimal wire bonding to leads. However, other than a very general and conclusory statement in the Office Action, there is nothing in the two references that reasonably suggests why one would actually combine the teachings of these two references.

The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination "must be based on objective evidence of record" and that "this precedent has been reinforced in myriad decisions, and cannot be dispensed with." In re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that "conclusory statements" by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved "on subjective belief and unknown authority." Id. at 1343-1344.

In the Office Action, in paragraph 2 of page 3, the Examiner provides the following statement to prove motivation to combine Yamada and Yuan:

It would have been obvious . . . to incorporate the teachings of Yuan into the device of Yamada in order to have “at least one additional lead connected to the die and disposed on an underside of the package body, the at least one additional lead being connectable to a circuit mounting structure trace passing between the adjacent leads separated by a space larger than the pitch” for a better support.

Applicant submits that these statements of obviousness are conclusory, and based on the type of “subjective belief and unknown authority” that the Federal Circuit has indicated provides insufficient support for an obviousness rejection. More specifically, the Examiner fails to identify any objective evidence of record which supports the proposed combination.

Lastly, with respect to claim 1, Applicant asserts that there is no reasonable expectation of success in achieving the present invention through a combination of Yamada and Yuan. Despite the assertion in the Office Action, Applicant does not believe that Yamada and Yuan are combinable since it is not clear how one would combine them to reach the claimed invention. No guidance was provided in the Office Action as to how the two references can be combined to achieve the present invention. However, even if combined, for the sake of argument, they would not achieve the techniques of the claimed invention, as described above.

Dependent claims 4-8 and 10-15 are patentable at least by virtue of their dependency on independent claim 1. The patentability of independent claim 1 is described above. Dependent claims 4-8 and 10-15 also recite patentable subject matter in their own right. For example, the combination of Yamada and Yuan fails to describe that: the additional lead is disposed on a side of the die on the underside of the package body closest to the space larger than the pitch, as recited in claim 5; at least one additional lead is disposed on each side of the die on an underside of the package body, as recited in claim 6; a space larger than pitch is disposed between two adjacent leads on each side of the package body, as recited in claim 7; and the space larger than the pitch is determined by the equation,  $LP = wx + p(x + 1)$ , as recited in claim 14.

Accordingly, withdrawal of the rejection of claims 1, 4-8 and 10-15 under §103(a) is respectfully requested.

With regard to the rejection of claims 2, 3, 9, 16 and 20 under 35 U.S.C. §103(a), as being unpatentable over Yamada in view of Yuan and Hayashida, Applicant respectfully traverses on the ground that the Examiner has failed to establish a proper *prima facie* case of obviousness.

First, assuming for purposes of argument that Yamada, Yuan and Hayashida are combinable, their collective teachings fail to teach or suggest all the limitations of each of claims 2, 3, 9, 16 and 20.

Dependent claims 2, 3 and 9 are patentable at least by virtue of their dependency on independent claim 1. The patentability of independent claim 1 is described above. Dependent claims 2, 3 and 9 also recite patentable subject matter in their own right. Independent claim 16 recites a leadframe for use in a packaged integrated circuit having a plurality of leads. A subset of the leads are separated by a lead-to-lead pitch. At least two adjacent leads are separated by a space larger than the pitch. This allows a circuit mounting structure trace to pass through the space when the leadframe is in use in a packaged integrated circuit having a package body which at least partially encloses the leadframe, so that the trace is connectable to an additional lead on an underside of the package body.

Hayashida discloses a semiconductor device with leads electrically connected with electrode pads. Projections are formed in the leads and are used for external connection ports. As described above with regard to claim 1, the combination of Yamada and Yuan fails to disclose an additional lead on an underside of the package body that is connectable to a circuit mounting structure trace passing between the adjacent leads separated by the space larger than the pitch. While Hayashida describes a projection of the lead that may be used for an external connection port on the underside of the package body, the proposed combination fails to disclose two adjacent leads separated by a space larger than the pitch allowing a circuit mounting structure trace to pass through the space so that the trace is connectable to an additional lead on an underside of the package body.

Second, with respect to claim 16, Applicant asserts that no motivation or suggestion exists to combine Yamada, Yuan and Hayashida in a manner proposed by the Examiner, or to modify their teachings to meet the claim limitations. For at least this reason, a *prima facie* case of obviousness has not been established.

For example, in the Office Action, in paragraph 5 of page 7, the Examiner provides the following statement to prove motivation to combine Yamada, Yuan and Hayashida:

It would have been obvious . . . to incorporate the teachings of Hayashida into the device of Yamada and Yuan in order to have “so that the trace is connectable to an additional lead on an underside of the package body” to connect the external circuitry.

Applicant again submits that these statements of obviousness are conclusory, and based on the type of “subjective belief and unknown authority” that the Federal Circuit has indicated provides insufficient support for an obviousness rejection. More specifically, the Examiner again fails to identify any objective evidence of record which supports the proposed combination.

Lastly, Applicant asserts that there is no reasonable expectation of success in achieving the present invention through a combination of Yamada, Yuan and Hayashida. Despite the assertion in the Office Action, Applicant does not believe that Yamada, Yuan and Hayashida are combinable since it is not clear how one would combine them to reach the claimed invention. No guidance was provided in the Office Action as to how the three references can be combined to achieve the present invention. However, even if combined, for the sake of argument, they would not achieve the techniques of the claimed invention, as described above.

Independent claim 20 recites a circuit mounting structure having similar limitations to those presented above with regard to independent claims 1 and 16. Therefore, those arguments presented above with regard to independent claims 1 and 16 are also applicable to independent claim 20.

Accordingly, withdrawal of the rejection of claims 2, 3, 9, 16 and 20 under §103(a) is respectfully requested.

With regard to the rejection of claims 17-19 under 35 U.S.C. §103(a), as being unpatentable over Yamada in view of Yuan, Hayashida and Yee, Applicant respectfully traverses on the ground that the Examiner has failed to establish a proper *prima facie* case of obviousness under 35 U.S.C. §103(a).

First, assuming for purposes of argument that Yamada, Yuan, Hayashida and Yee are combinable, their collective teachings fail to teach or suggest all the limitations of each of claims 17-19.

Claims 17-19 are patentable at least by virtue of their dependency on independent claim 16. The patentability of independent claim 16 is described above. Claims 17-19 also contain patentable subject matter in their own right. For example, claim 17 recites that the leadframe has at least one locking mechanism coupled between the adjacent leads having the space larger than the pitch, which maintains the space larger than the pitch. An illustrative embodiment of the locking mechanism is described on page 6 of the specification as creating a large pitch between two neighboring leadframe leads. Further, on page 7 of the specification, the locking mechanism in this illustrative embodiment is described as keeping the leadframe stable during manufacturing as a replacement for the depopulated leadframe leads.

In support for the rejection, the Office Action cites FIG. 3A of Yee. Yee discloses a semiconductor package and method of making a semiconductor packaging having lead locks to secure leads to encapsulant. The lead locks of Yee simply lock the leads in position. Therefore, the combination of Yamada, Yuan, Hayashida and Yee fails to disclose at least one locking mechanism coupled between the adjacent leads having a space larger than the pitch, which maintains the space larger than the pitch.

Second, Applicant asserts that no motivation or suggestion exists to combine Yamada, Yuan, Hayashida and Yee in a manner proposed by the Examiner, or to modify their teachings to meet the claim limitations. For at least this reason, a *prima facie* case of obviousness has not been established.

For example, in the Office Action, in paragraph 2 of page 10, the Examiner provides the following statement to prove motivation to combine Yamada, Yuan, Hayashida and Yee:

It would have been obvious . . . to incorporate the teachings of Yee into the device of Yamada, Yuan and Hayashida in order to have “at least one locking mechanism coupled between the adjacent leads having the space larger than the pitch therebetween, the locking mechanism being configured to maintain the space larger than the pitch.” to ensure a stable layout of the leadframe.

Applicant again submits that these statements of obviousness are conclusory, and based on the type of “subjective belief and unknown authority” that the Federal Circuit has indicated provides

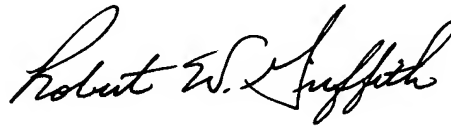
insufficient support for an obviousness rejection. More specifically, the Examiner again fails to identify any objective evidence of record which supports the proposed combination.

Lastly, Applicant asserts that there is no reasonable expectation of success in achieving the present invention through a combination of Yamada, Yuan, Hayashida and Yee. Despite the assertion in the Office Action, Applicant does not believe that Yamada, Yuan, Hayashida and Yee are combinable since it is not clear how one would combine them to reach the claimed invention. No guidance was provided in the Office Action as to how the three references can be combined to achieve the present invention. However, even if combined, for the sake of argument, they would not achieve the techniques of the claimed invention, as described above.

Accordingly, withdrawal of the rejection of claims 17-19 under §103(a) is respectfully requested.

In view of the above, Applicant believes that claims 1-20 are in condition for allowance, and respectfully requests withdrawal of the §103(a) rejections.

Respectfully submitted,



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